

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) An image recognizing method comprising the steps of:

(a) dividing an input image into a plurality of local-segments;

(b) registering a learning image into a learning image database;

(c) selecting a local-segment from the plurality of local-segments;

(d) extracting a learning-local-segment from the learning image database which is similar to the selected local-segment;

(e) relating the extracted learning-local segment to the selected local-segment;

(f) estimating a position of an object to be identified in the input image from coordinates of the selected local-segment and coordinates of the related learning-local-segment;

(g) updating a score of the estimated position in the input image:

(g)(h) repeating steps (c), (d), (e), and (f) and (g) for each local-segment of the plurality of local-segments; and

(h) ~~counting pairs formed of one of the local segments and the related learning local segment having an estimated position for the object substantially equal to a first position to determine a score for the first position to provide a score which indicates whether the object to be identified is present at a first position;~~ and

(i) judging that the object to be identified is present at the ~~first estimated~~ position when the ~~determined updated~~ score is greater than a predetermined number.

2. (Currently Amended) An image recognizing method comprising the steps of:

(a) dividing an input image into a plurality of local-segments;

(b) dividing a learning image into a set of learning-local-segments having a same size as the local-segments and making subsets, each subset formed of learning-local-segments, from the set of learning-local-segments, which are similar to each other;

(c) for each of the subsets of learning-local-segments, registering image data of a representative learning-local-segment and coordinates of all of the learning-local-segments of the corresponding subset into a same-type window database;

(d) selecting a local-segment from the plurality of local-segments;

(e) extracting a representative learning-local-segment from the same-type window database which is similar to the selected local-segment;

(f) relating the selected local-segment to one-a subset of the subsets of learning-local-segments which includes the extracted-representative learning-local-segment;

(g) estimating a position of an object to be identified in the input image from coordinates of the selected local-segment and coordinates of the related representative learning-local-segment;

(h) updating a score of the estimated position in the input image;

(i) repeating steps (d), (e), (f), and-(g) and (h) for each local-segment of the plurality of local-segments; and

(j) judging that the object to be identified is present at the first estimated position when the determined-updated score is greater than a predetermined number.

3. (Currently Amended) The image recognizing method according to claim 1, wherein:

said step (b) comprises the step of registering the learning image into the learning image database by a characteristic of the object to be identified;

said step (d) comprises the step of extracting the learning-local-segment which is similar to the selected local-segment from the learning image database by the characteristic; and

said step ~~(h)(g)~~ comprises the step of ~~counting pairs formed of one of the local-segments and the related learning-local-segment~~ ~~updating the score of the estimated position~~ by the characteristic.

4. (Previously Presented) The image recognizing method according to claim 2, wherein said step (c) comprises the step of, for each subset of learning-local-segments, registering image data of the representative learning-local-segment and coordinates of all of the learning-local-segments of the corresponding subset and a characteristic of the object to be identified into the same-type window database.

5. (Previously Presented) The image recognizing method according to claim 1, wherein:

step (d) includes the steps of;

(d-1) calculating a sum of one of (i) each square of a difference between a pixel value of the selected local-segment and a pixel value of one of the learning-local-segments and (ii) each absolute value of the difference between the pixel value of the selected local-segment and the pixel value of the one of the learning-local-segments for each learning-local-segment; and

(d-2) extracting a pair formed of the selected local-segment and a learning-local-segment for which the sum is minimized; and

step (e) includes the step of relating the selected local-segment to the learning-local-segment in the pair extracted in said step (d-2).

6. (Previously Presented) The image recognizing method according to claim 2, wherein:

step (e) includes the steps of;

(e-1) calculating a sum of one of (i) each square of a difference between a pixel value of the selected local-segment and a pixel value of one of the representative

learning-local-segments and (ii) each absolute value of the difference between the pixel value of the selected local-segment and the pixel value of the one of the representative learning-local-segments for each learning-local-segment; and

(e-2) extracting a pair formed of the selected local-segment and a representative learning-local-segment for which the sum is minimized; and

step (f) includes the step of relating the selected local-segment to the representative learning-local-segment in the pair extracted in said step (e-2).

7. (Currently Amended) An image recognizing apparatus comprising:

image dividing means for dividing an input image into a plurality of local-segments;

learning means for registering a learning image into a learning image database;

similar window extracting means for selecting a local-segment from the plurality of local-segments, for extracting a learning-local-segment from the learning image database which is similar to the selected local-segment, and for relating the extracted learning-local-segment to the selected local-segment;

object position estimating means for estimating a position of an object to be identified in the input image from coordinates of the selected local-segment and coordinates of the related learning-local-segment;

counting means for counting pairs formed of one of the local-segments and the related learning-local-segment having an estimated position for the object substantially equal to a first position to determine a score for the first position a score of the estimated position in the input image; and

object determining means for judging that the object to be identified is present at the first estimated position when the determined counted score is greater than a predetermined number.

8. (Currently Amended) An image recognizing apparatus comprising:

image dividing means for dividing an input image into a plurality of local-segments;

learning means for dividing a learning image into a set of learning-local-segments having a same size as the local-segments and for making subsets, each subset formed of learning-local-segments, from the set of learning-local-segments, which are similar to each other and for each subset of learning-local-segments, registering a representative learning-local-segment and coordinates of all of the learning-local segments of the corresponding subset into a same-type window database;

similar window extracting means for selecting a local-segment from the plurality of local-segments, for extracting from the same-type window database a representative learning-local-segment of one subset of the subsets which is similar to the selected local-segment of the input image, and for relating the extracted representative learning-local-segment to the selected local-segment;

object position estimating means for estimating a position of an object to be identified in the input image from coordinates of the selected local-segment and coordinates of the related representative learning-local-segment;

counting means for counting ~~pairs formed of one of the local segments and the related representative learning local segment having an estimated position for the object substantially equal to a first position to determine a score for the first position~~ a score of the estimated position in the input image; and

object determining means for judging that the object to be identified is present at the first estimated position when the determined counted score is greater than a predetermined number.

9. (Currently Amended) An image recognizing apparatus comprising:

image dividing means for dividing an input image into a plurality of local-segments;

learning means for registering learning images by a characteristic of an object to be identified into a learning image database;

similar window extracting means for selecting a local-segment from the plurality of local-segments, for extracting a learning-local-segment from the learning image database by the

characteristic which is similar to the selected local-segment, and for relating the extracted learning-local-segment to the selected local-segment by the characteristic;

object position estimating means for estimating a position of an object to be identified in the input image from coordinates of the selected local-segment and coordinates of the related learning-local-segment by the characteristic;

counting means for counting ~~pairs formed of one of the local-segments and the related learning-local segment having an estimated position for the object substantially equal to a first position to determine a score for the first position~~ score of the estimated position in the input image by the characteristic; and

object determining means for judging that the object to be identified is present at the ~~first estimated position when the determined counted score~~ greater than a predetermined number.

10. (Previously Presented) The image recognizing apparatus according to claim 8, wherein said learning means includes:

similar window integrating means for making the subsets of learning-local-segments which are similar to each other and for releasing image data of the representative learning-local-segment of each subset and the coordinates of all of the learning-local-segments in each subset; and

a same-type window database for storing the image data of the representative learning-local-segment of each subset and the coordinates of all of the learning-local-segments in each subset.

11. (Currently Amended) A computer-readable storage medium holding a program for making a computer carry out an image recognizing method, said image recognizing method comprising the steps of:

- (a) dividing an input image into a plurality of local-segments;
- (b) registering a learning image into a learning image database;
- (c) selecting a local-segment from the plurality of local-segments;

- (d) extracting a learning-local-segment from the learning image database which is similar to the selected local-segment of the input image;
- (e) relating the extracted learning-local-segment to the selected local-segment;
- (f) estimating a position of an object to be identified in the input image from coordinates of the selected local-segment and coordinates of the related learning-local-segment;
- (g) updating a score of the estimated position in the input image:
- (g)(h) repeating steps (c), (d), (e), and (f) and (g) for each local-segment of the plurality of local-segments; and
- (h) ~~counting pairs formed of one of the local segments and the related learning local-segment having an estimated position for the object substantially equal to a first position to determine a score for the first position; and~~
- (i) judging that the object to be identified is present at the first estimated position when the determined updated score is greater than a predetermined number.

12. - 19. (Canceled)